Cell Biology

BLOOD BRAIN BARRIER INTEGRITY POST 6-HYDROXYDOPAMINE LESIONS IN THE STRIATUM AND MEDIAN FOREBRAIN BUNDLE

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Prenatal exposure of lipopolysaccharide (LPS) endotoxin to rats causes inflammation in the striatum and substantia nigra (SN) that was observed by the increase of TNF-α and dopamine (DA) cell loss. Postnatal exposure of rotenone, a pesticide that does not readily cross the Blood Brain Barrier (BBB), in the same rats caused greater DA cell loss, which indicated increased BBB permeability. As a consequence, cell death in the brain can open the BBB, a chance for environmental toxins that usually do not cross the BBB to penetrate through it. Thus, if parenchymal neuronal cell loss caused by 6-hydroxydopamine (6-OHDA) lesions in the striatum and median forebrain bundle (MFB) induced dopamine cell death this would lead to extensive BBB leakage. In order to study this we lesioned eight Spargue Dawley Rats intra-striatally; four of the rats were injected with 3 µl of 6-OHDA and the remaining four with 3 µl of 0.2% Ascorbic Acid. In addition, four more rats were injected into the median forebrain bundle (MFB) with 3 µl 6-OHDA to ascertain whether or not the procedure of making intra-striatal injection caused BBB damage. BBB leaking was observed using FITC-albumin (fluorescein isothiocyanate conjugate with albumin) that was injected a minute prior to animal sacrifice. Rat stereotypy was also observed for one to two hours pre- and post-surgery. Rats received 32 mg/kg domperdione that was intraperitioneally injected as well as alternating injections of 0.75 mg/kg apomorphine and 1 mg/kg amphetamine, injected subcutaneously 30 min. later. Behavioral results indicated that there were not enough observations to conclude a significant difference in stereotypy between animal groups. FITC-albumin staining resulted in hotspots in the SN demonstrating that the BBB has become more permeable post 6-OHDA lesions in the striatum and MFB. Also, it has been determined that BBB leakage in the striatum does not appear to be correlated with the surgical procedure, but rather its toxic effects.

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